

CLAIMS

- 1 1. An x-ray imaging system comprising:  
2 a gas detector configured to retain a volume of gas, said gas detector having a  
3 first detection circuit corresponding to a first region of the gas and a second detection  
4 circuit corresponding to a second region of the gas, said first detection circuit being  
5 adapted to provide a first signal indicative of an intensity of x-rays radiating into the  
6 first region of the gas, said second detection circuit being adapted to provide a second  
7 signal indicative of an intensity of x-rays radiating into the second region of the gas,  
8 the first region of the gas being different than the second region of the gas.
- 1 2. The x-ray imaging system of claim 1, wherein said gas detector includes a  
2 chamber and the volume of gas is retained within said chamber.
- 1 3. The x-ray imaging system of claim 2, wherein said chamber engages said  
2 substrate and said first detection circuit and said second detection circuit are arranged  
3 between said chamber and said substrate.
- 1 4. The x-ray imaging system of claim 3, wherein said gas detector includes an  
2 electrode, said chamber is arranged between said electrode and said substrate, and said  
3 electrode is adapted to apply a potential difference across the gas arranged in said  
4 chamber.

1 5. The x-ray imaging system of claim 2, further comprising:  
2 a first gas reservoir selectively, pneumatically communicating with said  
3 chamber; and  
4 a second gas reservoir selectively, pneumatically communicating with said  
5 chamber such that gas from either said first gas reservoir or said second gas reservoir  
6 can be selectively provided to said chamber.

1 6. The x-ray imaging system of claim 1, wherein said gas detector includes a first  
2 chamber and a second chamber, the volume of gas is retained within said first  
3 chamber and said second chamber, the first region of the gas is defined by said first  
4 chamber, and the second region of the gas is defined by the second chamber.

1 7. The x-ray imaging system of claim 6, wherein said first chamber and said  
2 second chamber pneumatically communicate with each other.

1 8. The x-ray imaging system of claim 6, wherein said gas detector includes an x-  
2 ray stopping component arranged between said first chamber and said second  
3 chamber, said x-ray stopping component being adapted to absorb x-rays.

1 9. The x-ray imaging system of claim 1, wherein said first signal corresponds to  
2 at least a first pixel and said second signal corresponds to at least a second pixel.

1 10. The x-ray imaging system of claim 1, further comprising:  
2 an image processing system configured to receive said first signal and said  
3 second signal, said image processing system being further configured to generate first  
4 pixel data corresponding to at least a first pixel from said first signal and second pixel  
5 data corresponding to at least a second pixel from said second signal.

1 11. The x-ray imaging system of claim 10, wherein said image processing system  
2 includes a display device and is further configured to render the first pixel data and the  
3 second pixel data on said display device.

1 12. The x-ray imaging system of claim 1, further comprising:  
2 means for applying a potential difference across the volume of gas.

1 13. The x-ray imaging system of claim 1, further comprising:  
2 means for changing a pressure of the volume of gas.

1 14. The x-ray imaging system of claim 1, further comprising:  
2 means for changing the gas from one type of gas to another type of gas.

1 15. A method for imaging with the use of x-rays, said method comprising:  
2 providing a volume of gas;  
3 defining a first region of the gas and a second region of the gas, the first region  
4 of the gas being different than the second region of the gas;  
5 generating a first signal indicative of an intensity of x-rays radiating into the  
6 first region of the gas, the first signal corresponding to at least a first pixel; and  
7 generating a second signal indicative of an intensity of x-rays radiating into  
8 the second region of the gas, the second signal corresponding to at least a second  
9 pixel.

1 16. The method of claim 15, further comprising:  
2 rendering the first pixel based on the first signal; and  
3 rendering the second pixel based on the second signal.

1 17. The method of claim 15, wherein the first region of gas is defined by a first  
2 chamber and the second region of gas is defined by a second chamber.

1 18. The method of claim 15, wherein the volume of gas is retained within a  
2 chamber; and

3 further comprising:

4 changing a pressure of the volume of gas within the chamber.

1 19. The method of claim 15, further comprising:

2 providing an object to be imaged, the object being arranged at least partially

3 between a source of x-rays and the volume of gas;

4 generating additional signals indicative of the intensity of x-rays radiating into

5 the first and second regions of the gas; and

6 generating sequential images corresponding to the object based on the

7 additional signals.

1 20. The method of claim 19, further comprising:

2 moving the object relative to the volume of gas while the object is being

3 radiated.

1 21. An imaging system comprising:

2 a gas distributed to define plural imaging volumes arranged in an array,

3 said gas being susceptible to ionization;

4 an ionization detector for providing indications of ionization of said gas

5 for at least some of said imaging volumes; and

6 an image generator for converting said indications into an image.

1 22. The imaging system of claim 21, further comprising:  
2 an x-ray source for ionizing said gas within said imaging volumes as a function of  
3 characteristics of an object being imaged.

1 23. The imaging system of claim 21, wherein:  
2 said image generator includes pixels for displaying said image; and  
3 at least some of said imaging volumes correspond to at least some of said pixels.

1 24. The imaging system of claim 21, wherein at least some of said imaging  
2 volumes are separated from others of said imaging volumes.

1 25. The imaging system of claim 21, wherein said imaging volumes are defined by  
2 chambers, each of said chambers being spaced from adjacent ones of said chambers.

1 26. The imaging system of claim 25, further comprising:  
2 gas passages formed between at least some of said chambers, said gas passages  
3 enabling adjacent ones of said chambers to communicate pneumatically.

1 27. An imaging method comprising:  
2 detecting ionization at respective gas volumes in an array of gas volumes; and  
3 converting the ionization detected into an image.

1 28. The method of claim 27, further comprising:  
2 irradiating an object with x-rays so as to ionize at least some of said gas.  
3

4 29. The method of claim 27, further comprising:  
5 providing an object to be imaged;  
6 irradiating the object with so as to ionize at least some of said gas;  
7 generating first signals indicative of an intensity of ionization in a first of the  
8 gas volumes;  
9 generating second signals indicative of an intensity of ionization in a second of  
10 the gas volumes; and  
11 generating sequential images corresponding to the object based on the signals  
12 generated.

1 30. The method of claim 29, further comprising:  
2 moving the object relative to the gas volumes.

- 3     31.     The method of claim 29, further comprising:
- 4           providing a first pixel;
- 5           providing a second pixel;
- 6           rendering the first pixel based on the first signals; and
- 7           rendering the second pixel based on the second signals.

0994188 1204  
10010188 1204